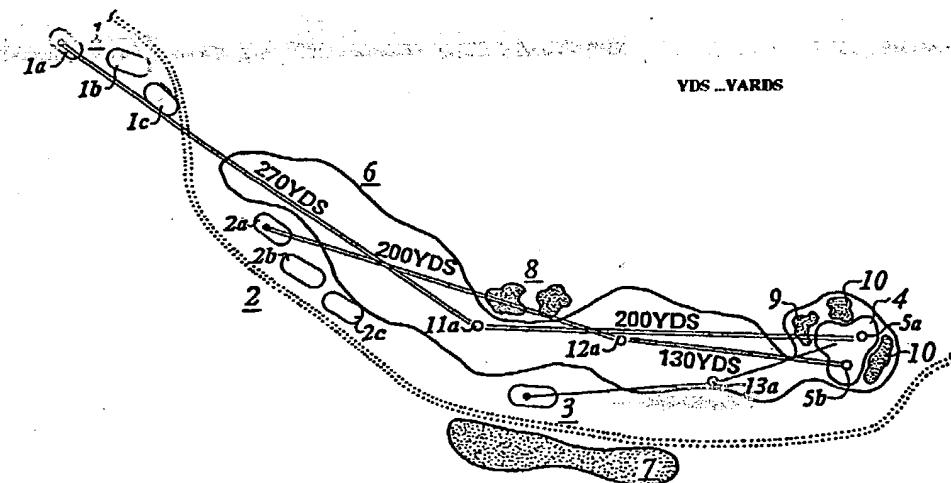




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>5</sup> :  A63B 69/36		A1	(11) International Publication Number: WO 95/02436  (43) International Publication Date: 26 January 1995 (26.01.95)
(21) International Application Number: PCT/US94/07626  (22) International Filing Date: 8 July 1994 (08.07.94)		(81) Designated States: AU, BR, CA, JP, KR, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).	
(30) Priority Data: 08/092,746 16 July 1993 (16.07.93) US		Published <i>With international search report.</i>	
(71) Applicant: ROBERT TRENT JONES, FLORIDA, INC. [US/US]; P.O. Box 24099, Fort Lauderdale, FL 33307 (US).			
(72) Inventor: JONES, Robert, Trent; 1900 South Ocean Drive, #1611, Fort Lauderdale, FL 33316 (US).			
(74) Agents: SMITH, Albert, C. et al.; Fenwick & West, Suite 500, Two Palo Alto Square, Palo Alto, CA 94306 (US).			

## (54) Title: COMPACT GOLF FACILITY AND METHOD FOR ELIMINATING HANDICAP SCORING



## (57) Abstract

A compact golf facility and golf playing method include a driving range (24) and a golf course (19) comprising a plurality of holes that each includes a plurality of teeing areas (1-3), a target green (4), and a plurality of target cups (5) within the target green (4). The various teeing areas (1-3) are positioned at significantly different distances from the target green (4) and various target cups (5) are spaced about the target green (4) to provide multiple teeing areas (1-3) and target cup (5) combinations with associated different trajectories over various terrain to accomodate a wide range of skill levels among players. Players can therefore directly compare their actual scores on each hole, and over the entire course, without adjusting those scores by a handicap figure. The driving range (24) includes two drive teeing areas (25-28) that are displaced at opposite ends of a common target area a sufficient distance apart to assure that a ball driven from one drive/teeing area (25-28) cannot reach the drive/teeing area (25-28) at the opposite end of the target area. This driving range (24) uses half the width of a conventional driving range containing only a single drive/teeing area and only slightly longer length to accomodate a comparable number of players simultaneously.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

## COMPACT GOLF FACILITY AND METHOD FOR ELIMINATING HANDICAP SCORING

5

### BACKGROUND OF THE INVENTION

#### 1. Field of Invention

This invention relates to golf courses, and more particularly to a scheme for substantially equalizing the degrees of difficulty encountered by players of different skills and abilities in playing any hole on the course, and a scheme for reducing the land area required for a traditional golf facility including a golf course and a driving range.

10

#### 2. Description of the Related Art

The game of golf, though extremely popular in the United States and elsewhere, suffers from a number of inherent disadvantages. One set of disadvantages arises from the fact that different golfers can differ greatly in playing ability. Another disadvantage arises 15 from the fact that traditional golf facilities require large amounts of vacant land.

Golf playing ability is manifested in the ability to drive a golf ball for distance, and in the ability to drive a golf ball with accuracy. In general, a player who is able to consistently drive a golf ball further than another player where the driving accuracies of the players are comparable, will reach the target cup from the same teeing area in fewer 20 strokes. Similarly, a player who is able to consistently place a golf ball with greater accuracy than another player where the distance-driving abilities of the players are comparable, will generally reach the target cup in fewer strokes.

That one player is consistently able to reach the target cups in fewer strokes than a second player has at least two side effects. The second player will rarely if ever be able to 25 complete the entire course in fewer total strokes than the first player and thus competitiveness between the players will be diminished or even nonexistent assuming that the game is scored based exclusively upon the total strokes required. The second side effect is that the second player will consistently require a greater amount of time to complete the same course as the first player, assuming that the players traverse the course 30 between strokes at about the same rate. Players with lower skill levels thus delay players with greater skill levels.

As the game of golf is presently scored, the lack of comparable skill levels among players can be alleviated by a conventional handicap scoring system. Two players with different handicaps can compare their scores on a particular golf course by adjusting their respective total strokes by their handicaps and then by comparing the adjusted results. One 5 drawback to this system of scoring is that handicap scoring is applicable to total strokes over the entire golf course and is not readily suitable for special scoring per hole. For example, it is common for a group of players to place a wager on lowest score for a particular hole. While differing handicaps between the players within the group may adjust for different total strokes over the entire course, the handicap is less useful and possibly 10 even useless with respect to scoring for a particular hole.

Moreover, although handicapping alleviates the lack of comparable skill levels among players, it does not alleviate the delays imposed on more skilled players by the less skilled players.

With regard to the second inherent disadvantage of golf, requiring large amounts of 15 vacant land generally makes it expensive and difficult to create traditional golf facilities.

Traditional golf facilities contain not only a golf course comprising a series of 9 or 18 holes, but also practice putting greens and a driving range. The putting greens and driving range allow players to practice their skills in preparation for playing the course. Although putting greens are usually fairly small, driving ranges are typically very large in 20 relationship to the size of the entire golf facility. Thus, the inclusion of a driving range and a golf course greatly exacerbates the problem of acquiring sufficient land for a traditional golf facility.

It is therefore an object of the present invention to alleviate the side effects resulting from the differing playing abilities without dramatically altering the basic games 25 of golf. It is another object of the present invention to account for different abilities to drive the ball for distance and for accuracy on a hole by hole basis to alleviate the effects of disparate skill levels among players and to eliminate the use of the conventional handicap scoring system with its concomitant shortcomings. It is still another object of this invention to provide a traditional golf facility which includes a large capacity driving range

## SUMMARY OF THE INVENTION

In accordance with the present invention, a golf course and method are provided with either 9 or 18 "holes" of the type disclosed herein. Specifically, each hole includes an initial teeing area and a plurality of supplemental teeing areas, a target green, a middle area comprising the area between the initial teeing area and the target green, and a border green comprising the area beside and behind the target green in relation to the teeing areas. The target green is usually displaced many yards from the teeing areas and comprises an area of very closely-cropped grass preferably containing more than one target cup in accordance with one embodiment of the present invention. The middle area and border green comprise variable terrain of various surfaces, including cut and uncut grass, various contours, including flat surfaces, gullies and mounds, and various obstacles, including trees, water hazards, boulders and sand traps.

In accordance with the present invention, a plurality of supplemental teeing areas are positioned in the middle area and are typically laterally displaced relative to an axis oriented between the initial teeing area and one of the target cups.

All such teeing areas are thus positioned with respect to a target cup on a target green to encompass significantly different terrain with respect to distances and trajectories to the target cup and with respect to surfaces, contours, obstacles, and hazards in reaching the target cup. The teeing areas are thus arranged so that two players with different abilities to drive a golf ball for distance and to drive a golf ball with accuracy can tee off from different particular teeing areas and encounter levels of difficulty with respect to the skill levels involved that will require directly comparable numbers of strokes to hit a golf ball from the respective teeing areas to a particular target cup on a target green. The scoring scheme is thereby simplified by requiring each player to count only the number of strokes without need to adjust total score by any handicap figure.

The target green contains two target cups, each positioned about the target green so that, from any given position within the middle area or on the target green, the difficulty with respect to stroking the ball into the cup will vary significantly between cups. The difference in difficulty may be manifested by the contours of the part of the green

bunkers and water hazards, relative to the approach to each cup. On any particular hole, a player tees off from one teeing area and strokes the ball into one teeing cup. By providing a plurality of teeing areas and two target cups, the present invention provides a great number of teeing area and target cup combinations per hole to provide a wide range of 5 playing difficulties associated with such combinations to accommodate a wide range of player skills.

In addition to providing a golf course comprising 9 or 18 holes of the type disclosed herein that are laid out in orderly sequence, the present invention also provides one or more practice putting greens, and a driving range of the type disclosed herein. 10 Specifically, the driving range includes two distinct drive-teeing areas at opposite ends of a target area. Players are dispersed along each drive-teeing area and each player drives golf balls generally in the same direction as each other player on the same drive-teeing area. The two drive-teeing areas are disposed at opposite ends of a common target area such that the players on one drive-teeing area face the player on the other drive-teeing area and such 15 that all players on each drive-teeing area drive their golf balls into the common target area between the two drive-teeing area. Of course, the drive-teeing areas are displaced far enough apart so that players driving a ball from one drive-teeing are cannot reach the other drive-teeing area. This driving range allows the same number of players to simultaneously 20 drive golf balls as does a typical driving range having only a single drive-teeing area at one end of a target area, but it does so using a land area of about half the width of the land area required for the typical driving range.

#### BRIEF DESCRIPTION OF THE DRAWINGS

25 Fig. 1 is a plan view of one layout for one hole of golf course according to the present invention;

Fig. 2 is a plan view of a layout of a golf facility including a plurality of holes for a golf course and a driving range according to the present invention; and

30 Figs. 3A and 3B comprise a plan view of another layout of a golf facility according to the present invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Fig. 1, there is shown a preferred embodiment of one hole of golf course according to the present invention including an initial teeing area 1 and a target green 4 within which a plurality of target cups 5(a) and 5(b) is located. Lying in the area between the initial teeing area 1 and the target green 4, but displaced off the axis of trajectory line between the initial teeing area 1 and the target green 4, are supplemental teeing areas 2 and 3. The embodiment shown in Fig. 1 includes three total teeing areas according to the invention where each teeing area is positioned a substantial differential distance from the target green 4 and may include one or more teeing surfaces or sub-teeing areas per teeing area. A number of typical golf course obstacles 5 may be located about and between the target green 4 and the teeing areas, including tree areas 6 10 and 7, water hazard 8, and sand traps 9 and 10.

Figure 1 illustrates approximate strategies for reaching the target cup 5(a) or 5(b) from each of the teeing areas 1, 2 and 3. For example, Player A teeing off from initial teeing area 1 would likely attempt to reach position 11(a) on the first drive toward the target green 4. Similarly, 15 Player B teeing off from supplemental teeing area 2, would likely attempt to reach position 3, would likely attempt to reach position 13(a) on the first drive. In the illustrated embodiment of Figure 1, a drive from initial teeing area 1 would have to travel about 270 yards and avoid the tree area 6 to land beside the water hazard 8 about 200 yards from the target green 4. Similarly, a drive from the supplemental teeing area 2 would have to travel about 200 yards and clear the water hazard 8 and land about 130 yards from the target green 4. And, a drive from supplemental teeing 20 area 3 would have to travel about 90 yards, face no obstacles, and land about 80 yards from the target green 4. Reaching position 11(a) from initial teeing area 1 is arranged to be more difficult than reaching position 12(a) from supplemental teeing area 2 with respect to distance and with respect to the hazards involved. With respect to the distances involved, the difference is about 70 yards, and with respect to accuracy needed, reaching position 11(a) requires avoiding tree area 6 25 and avoiding, but landing near, water hazard 8. Thus, teeing off from initial teeing area 1 is established to be a more difficult task for more skilled players than teeing off from supplemental teeing area 2 that is positioned substantially closer to the target green 4 and that only requires clearing water hazard 8 to reach position 12(a).

Similarly, reaching position 12(a) from supplemental teeing area 2 is more difficult than reaching position 13(a) from supplemental teeing area 3 with respect to both the distance and the hazards involved. Thus, reaching position 13(a) from supplemental area 3 requires less skill to drive over a shorter distance with no obstacles.

5 Figure 1 also shows approximate strategies for second shots for each of Players A, B, and C who teed off, respectively, from the teeing areas 1, 2 and 3, as previously described. Player A would likely attempt to reach the target green 4 on the second stroke along a path or trajectory over the sand trap 9. Player B would likely attempt to reach the target green 4 on the second stroke along a path or trajectory that should avoid overshooting into sand trap 10. And, Player C would likely attempt to reach the target

10 green 4 on the second stroke along a path or trajectory that avoids all obstacles and hazards. As thus described with references to the illustrated embodiment of Figure 1, the ball of each Player A, B, and C is expected to lie on the target green 4 after the second stroke of each player, despite wide variations in the skill levels of the players. Reaching

15 the target green 4 from position 11(a) is more difficult than reaching the target green 4 from position 12(a) because the former may require a drive of about 200 yards while the latter may require a drive of only about 130 yards, and because the hazards involved in both drives are roughly equivalent. Similarly, reaching the target green 4 from position 12(a) is more difficult than reaching the target green 4 from position 13(a) because the

20 former may require a drive of about 130 yards that avoids that hazards while the latter may require a drive of only about 80 yards with essentially no hazards involved. Thus, the terrain and trajectories involved in teeing off from the initial teeing area 1 or from the supplemental teeing areas 2 or 3 vary significantly to accommodate the different levels of skill involved among the players who therefore can all play the same hole in substantially

25 the same number of strokes without need for handicap adjustments of the respective scores.

In accordance with another aspect of the present invention, a plurality of target cups 5(a) and 5(b) are provided on the target 4 to be associated with the different teeing areas 1, 2 and 3 to provide greater variations in stroke combinations and strategies for

plurality of target cups on the target green 4. Using three target cups on a target green for three teeing areas that may be spaced by about 80 to 170 yard increments relative to a target green can thus provide nine different degrees of difficulty over various terrain and trajectories to accommodate widely varying skill levels of players who can nevertheless 5 play a hole in comparable numbers of total strokes.

In accordance with still another aspect of the present invention, a plurality of sub-teeing areas is provided within each area. For example, in Figure 1, initial teeing area 1 includes sub-teeing areas 1(a), 1(b) and 1(c). Similarly, supplemental teeing area 2 includes sub-teeing areas 2(a), 2(b), and 2(c). Just as the initial and supplemental teeing 10 areas are displaced about the hole so that each teeing area bears a different relationship with the target green 4 with respect to distance to the target green 4 and with respect to the obstacles, terrain, and hazards faced in reaching the target green 4, so the sub-teeing areas contained within a single teeing area are displaced about that teeing area so that each sub-teeing area bears its own relationship to the target green 4. By providing a plurality of sub-teeing areas within each teeing area, the present invention allows for an even greater 15 number of distinct levels of difficulty per hole embodied by teeing area and target cup combinations.

Referring now to Figure 2, there is shown a preferred embodiment of an entire golf facility according to the present invention, including a golf course 19, putting green 21 and 20 23, and driving range 24. The golf course 19 comprises 9 holes of the type illustrated in Figure 1 that bear the succession of hole numbers #1 through #9 and that are arranged as in a typical golf course with the target green of one hole lying adjacent to the initial teeing area of the hole bearing the next higher number, with no hole overlapping any part of the terrain associated with any other hole. Figure 2 illustrates that, in accordance with the 25 present invention, different holes of a golf course can comprise different numbers of teeing areas. For example, hole #2 contains five teeing areas 25 and hole #3 contains three teeing areas 26. Also, each target green may contain a plurality of target cups, as illustrated in Figure 2.

Figure 2 illustrates a driving range 24 containing two drive-teeing areas 27 and 28

point along drive-teeing area 28 and drive the ball into the target area 29. Similarly, a player may tee a ball at some point along drive-teeing area and drive the ball into target area 27 from the opposite end. Drive-teeing areas 27 and 28 are displaced typically over 350 yards apart to assure that no player driving a ball from drive-teeing area 28 can reach 5 the drive-teeing area 27 with his drive, and conversely. With the drive-teeing areas 27 and 28 displaced in this manner at opposite ends of the driving range 24, the driving range 24 may be half the width of a typical driving range comprising only a single drive-teeing area to accommodate a comparable number of players simultaneously. In this configuration, the 9-hole golf course 19 and practice putting greens 21 and 23, and driving range 24 may all 10 be arranged within as little land area as about 50 acres.

Referring now to Figure 3, there is shown a preferred embodiment of an entire golf facility according to the present invention, including a golf course 31, putting green 32, and driving range 33. The golf course 31 comprises 18 holes of the type illustrated and described above with reference to Figure 1, where each of the 18 holes bears a successive 15 one of the numbers #1 through #18 and is arranged as in a typical golf course with the target green of one hole lying adjacent to the initial teeing area of the hole bearing the next higher number, and with no hole overlapping any part of the terrain associated with any other hole. Each target green for a hole includes a plurality of target cups, and each target cup may be associated with a selected one of the plurality of initial and supplemental 20 teeing areas for that hole in the manner previously described. The driving range 33 is formed substantially as illustrated and described above with reference to Figure 2. In this configuration, the 18-hole golf course 31, and practice putting area 32, and driving range 33 may all be arranged in as little land area as about 100 acres.

Therefore, the game according to the present invention retains most of the features 25 and aspects of the standard game of golf while eliminating or alleviating problems or inconveniences associated with the standard game including handicap scoring, lack of competitiveness, playing delay, and large land requirements for golf facilities. By providing a plurality of teeing areas and a plurality of target cups for each hole, the present invention allows players of different abilities to play the same hole and face equal

a target cup. This is possible because the teeing areas and target cups are disposed in such as way that each distinct teeing area and target cup combination represents a different degree of difficulty with respect to stroking a golf ball into the target cup from the teeing area. Because players of different abilities will each face the same subjective difficulty 5 level for each hole, each player will, on average, complete each hole in the same number of strokes. This will allow players of different abilities to compete on an even footing on each hole, as well as over the entire course, without the need to employ a handicap scoring system. This will also cause all players to complete each hole in roughly the same amount of time on average.

10 In playing the game of the present invention, a group of players playing the course together will, in playing a particular hole, proceed first as a group to the initial teeing area. Any players within the group who will be teeing off from the initial teeing area will make their initial drives from that area. After those players have completed their initial drives, the group will move to the next closest supplemental teeing area from which some players 15 in the group will tee off. Playing in this manner, the group will eventually arrive at the target green at roughly the same time.

The present invention alleviates the problem of acquiring large amounts of land for traditional golf facilities which include a golf course and a driving range by reducing by about half the area of land required for the driving range. The present invention 20 accomplishes this area reduction by including drive-teeing areas at opposite ends of the driving range. In this way, a driving range according to the present invention can accommodate the same number of players as a conventional driving range having only a single drive-teeing area at one end of the range, while using land area of only half the width and only slightly greater length than a conventional driving range.

## CLAIMS

We claim:

1. A target hole for golf comprising:
  - an initial teeing area;
  - 5 a target green including at least one target cup;
  - a plurality of obstacles and hazards positioned about a line of trajectory between the initial teeing area and the target green; and
  - a plurality of supplemental teeing areas disposed between the initial teeing area and the largest green, each supplemental teeing area being displaced relative to the line of trajectory between the initial teeing area and the largest green
  - 10 and positioned relative thereto at significant different distances along lines of trajectory therebetween including different surfaces, contours, obstacles, or hazards to provide different degrees of difficulty in stroking a golf ball between a teeing area and the target green.
- 15 2. A target hole as in claim 1 including a plurality of target cups spaced about the target green to provide different trajectories relative to various surfaces, contours, obstacles or hazards disposed between a teeing area and the target green.
3. A target hole as in claim 2 in which each of said teeing areas is associated with a corresponding target cup in the target green.
- 20 4. A target hole as in claim 2 in which each said teeing area includes a plurality of sub-teeing areas displaced about the teeing area, each sub-teeing area being positioned to provide different lines of trajectory and different degrees in difficulty in stroking a golf ball between such sub-teeing area and said target green.
5. A golf facility including a succession of a plurality of target holes according to claim 1, arranged with each target hole bearing a successive number between one and the number of total target holes with the target green of each target hole including a plurality of target cups therein lying adjacent to the initial teeing area of the next higher numbered target hole, and with no line of trajectory for any target hole overlapping any part of the terrain of any other target hole.

6. A driving range comprising:  
a target area including a plurality of spaced target zones therein, and  
drive-teeing areas disposed at opposite ends of the target area and positioned at  
distances apart in excess of the distance a ball could be driven from one  
5 drive-teeing area toward the other drive-teeing area.

7. A driving range according to claim 6 wherein the drive-teeing areas are  
disposed in substantially lateral orientation relative to the line of trajectories of balls driven  
therefrom toward target zones in the target area, and are disposed not less than about 350  
yards apart.

10 8. A method of playing a golf-course target hole that includes an initial teeing  
area, a target green including a plurality of target cups, a middle area between the initial  
teeing area and the target green and containing a plurality of obstacles and hazards, and  
that includes a plurality of supplemental teeing areas disposed about the middle area where  
each supplemental teeing area is displaced relative to the line of trajectory between the  
15 initial teeing area and the target green and is positioned relative thereto at significant  
different distances along lines of trajectory therebetween that contain different surfaces,  
contours, obstacles, or hazards to provide different degrees of difficulty in stroking a golf  
ball between a teeing area and the target green, the method comprising the steps of:

20 determining the golf playing ability of a player;  
selecting for that player according to his ability one of the said teeing areas and one  
of the said target cups;  
stroking a golf ball from the selected teeing area by the player toward the selected  
target cup; and  
successively stroking of the golf ball by the player toward the selected target cup  
25 until the player strokes the ball into said target cup.

9. The method according to claim 8, comprising the additional step of:  
counting the total number of strokes the player takes to stroke the ball into the  
selected one of the target cups.

10. The method according to claim 8 for a plurality of players of different golf-playing skill levels playing a target hole together, and comprising the step of:

selecting a combination of a teeing area and target cup to provide a degree of difficulty relative to the skill level of one player to be substantially equivalent to the degree of difficulty relative to the skill level of another player presented by another combination of teeing area and target cup.

5

11. The method according to claim 10, comprising the additional steps of: counting the total number of strokes each player takes to stroke the ball between the teeing area and the target cup selected for that player;

10

comparing the total stroke count for each player; and

determining as the winner of said target hole the player with the lowest total stroke count.

15

12. The method of scoring among a plurality of players playing an entire golf course containing a succession of a plurality of target holes according to claim 11,

comprising the additional steps of:

summing for each player the total strokes for each hole of the course; comparing the total strokes over the entire course for each player; and

20

determining as the winner over the entire course the player with the lowest total strokes over the entire course without adjustment for a handicap in the total strokes for each player.

1/6

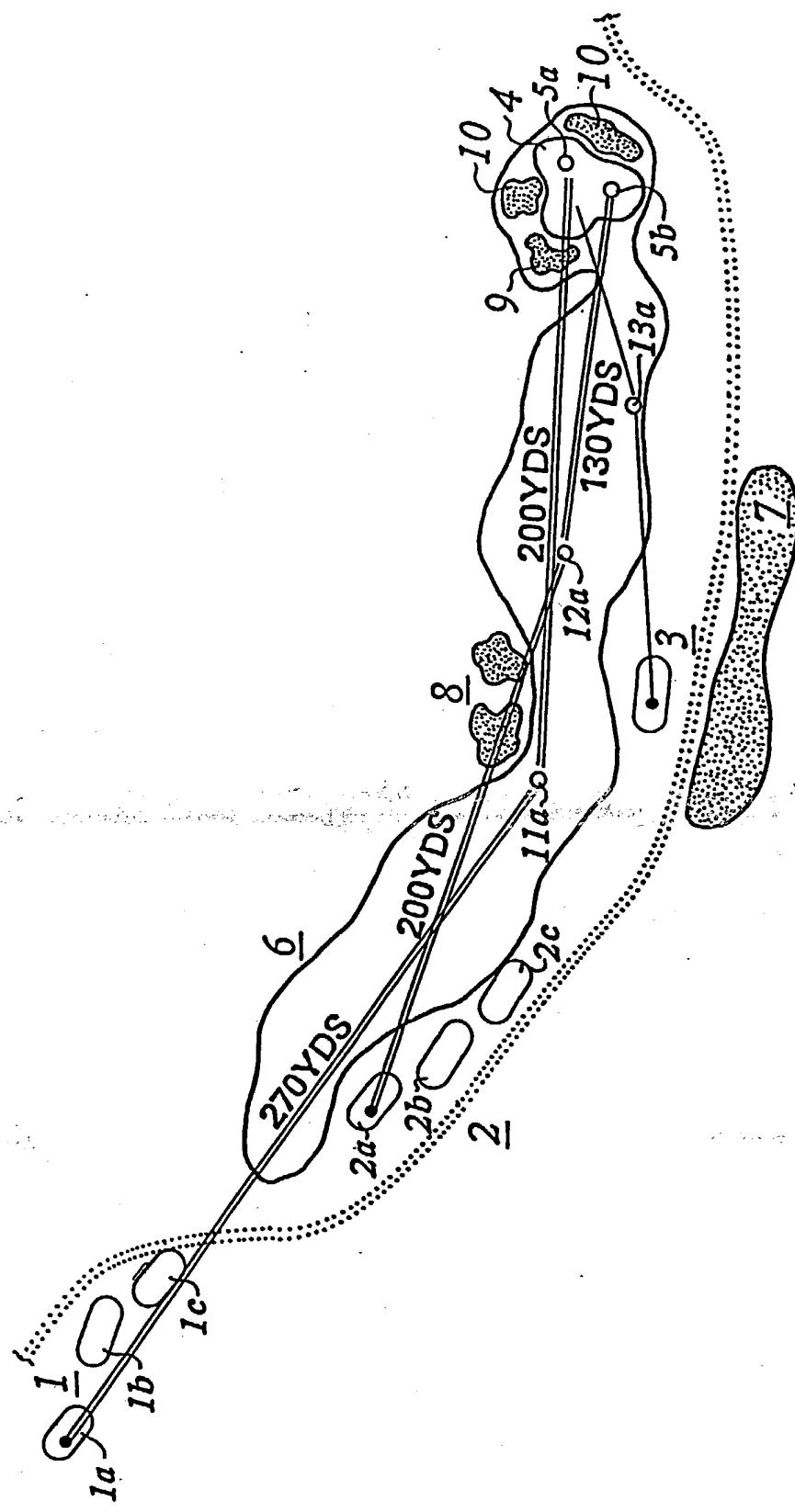


Figure 1

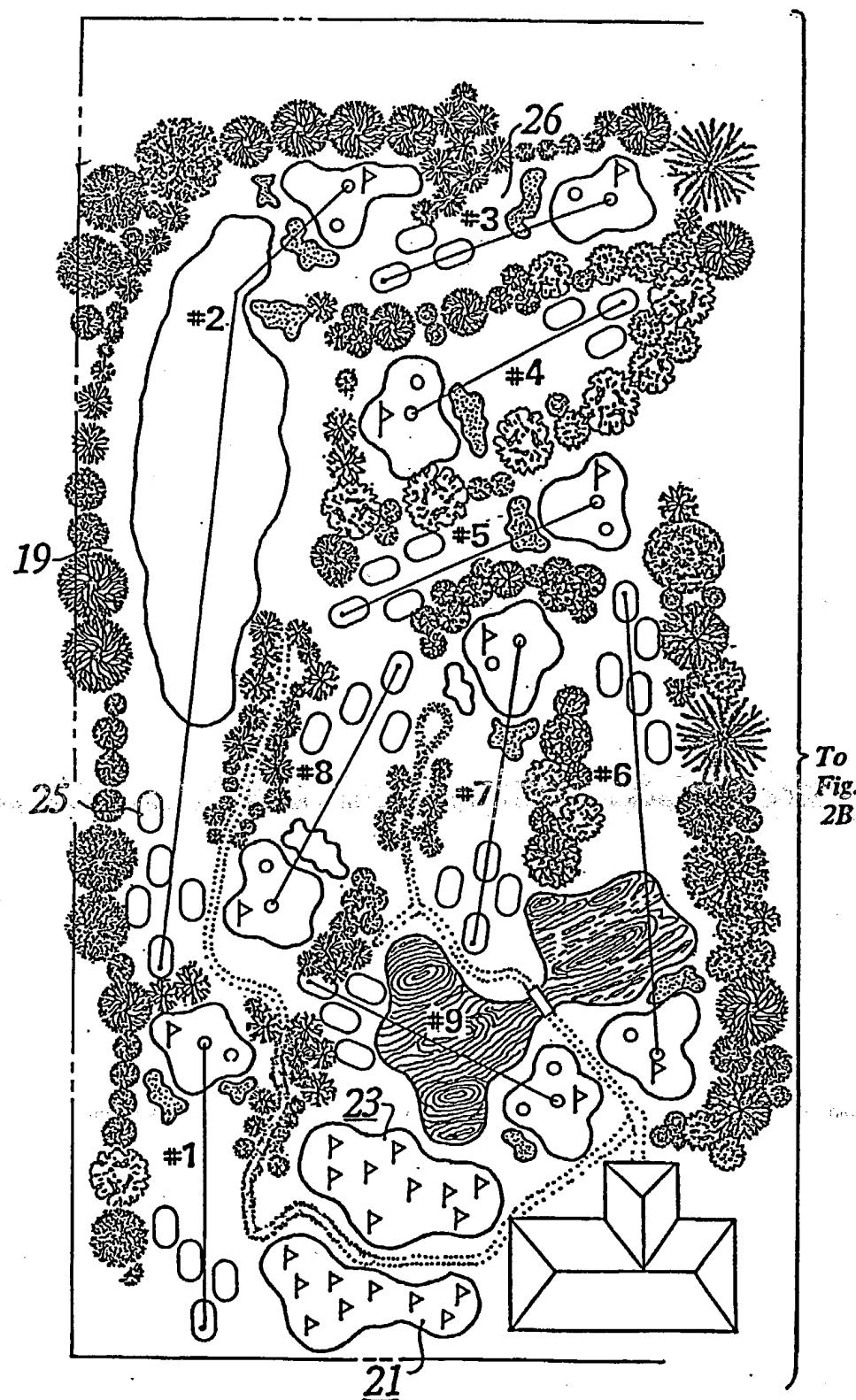


Figure 2A

3/6

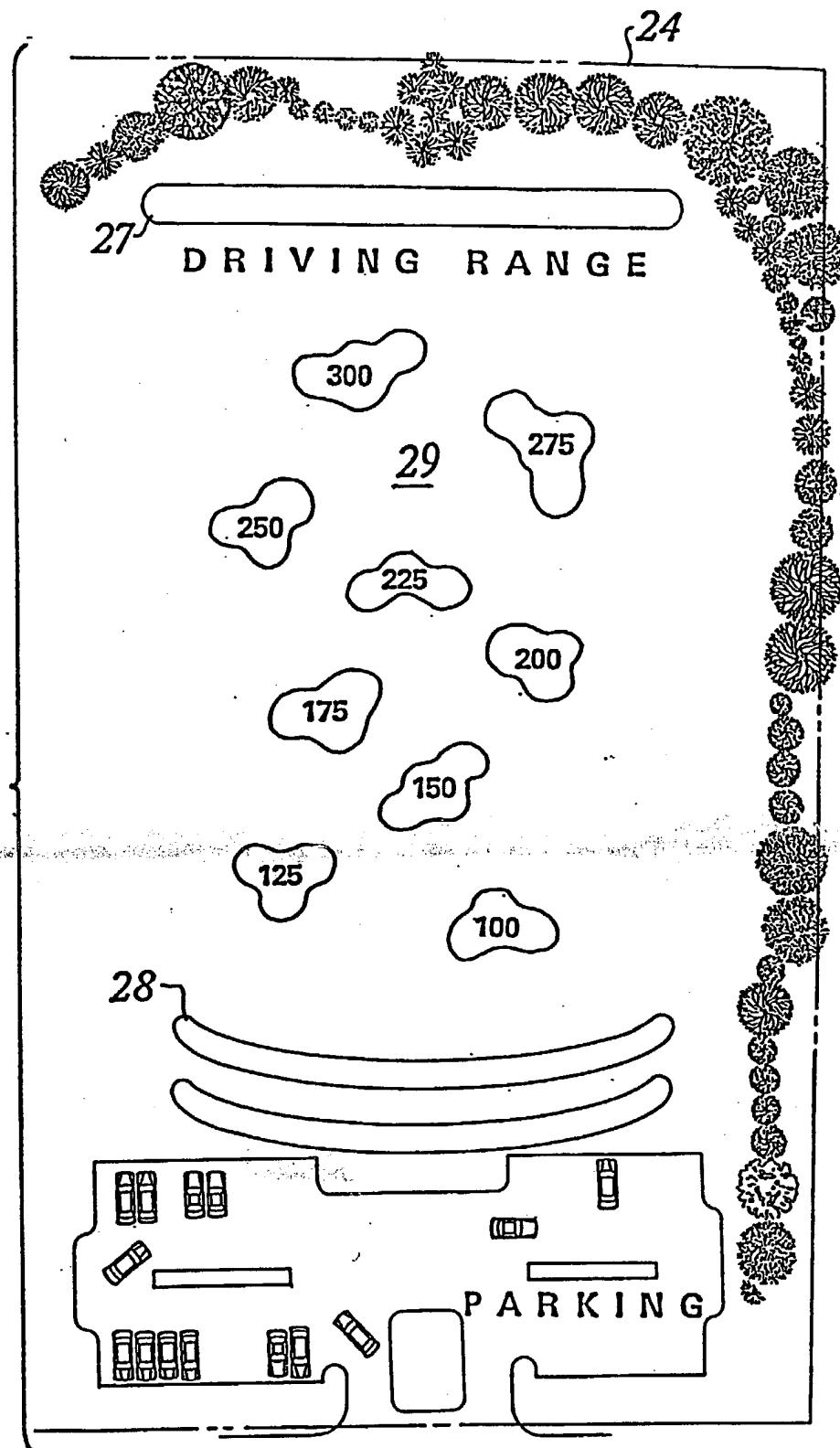


Figure 2B

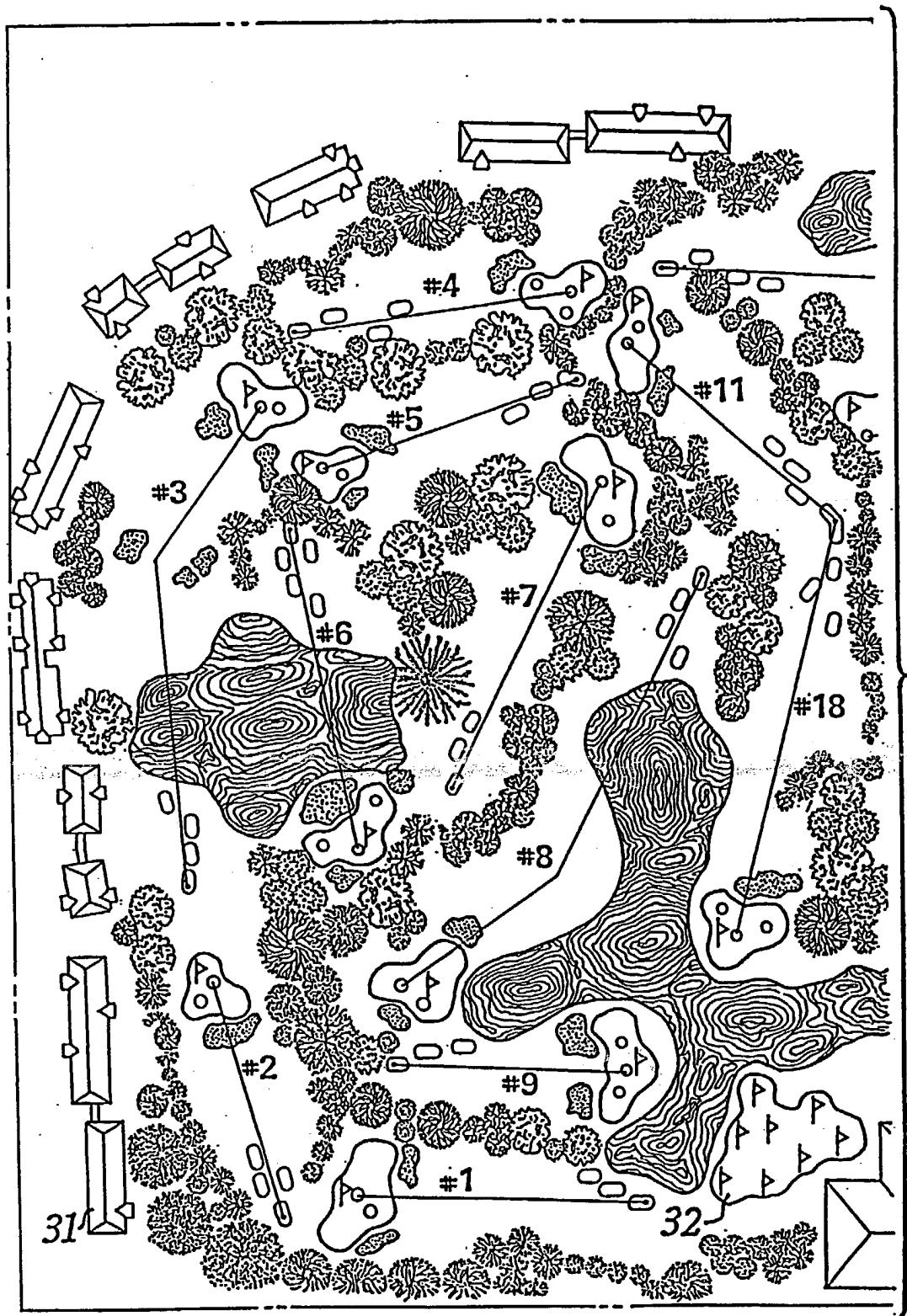


Figure 3A

From  
Fig.  
3A

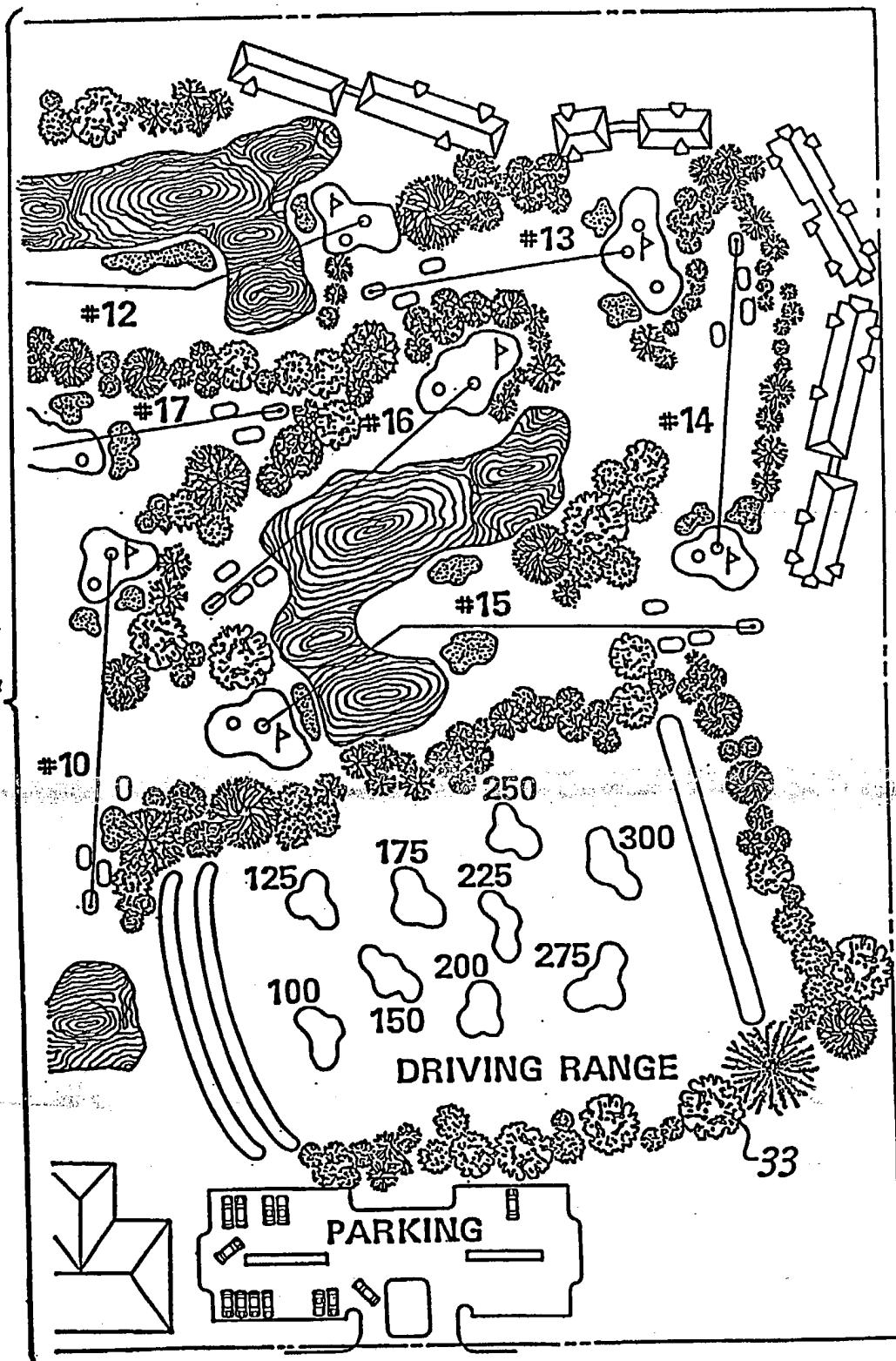


Figure 3B

6 / 6

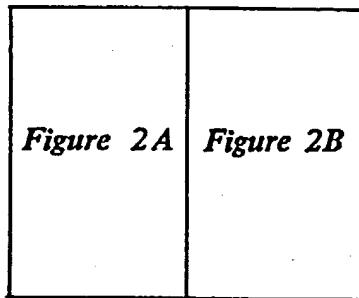


Figure 2

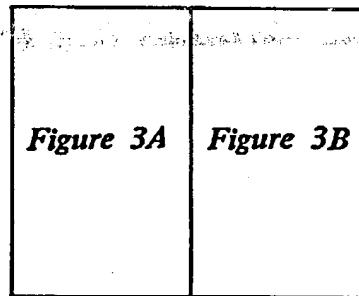


Figure 3

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US94/07626

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :A63B 69/36  
US CL :273/35, 176

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 273/32R, 35, 176

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NONE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, A, 5,076,586, (TANIGUCHI ET AL.), 31 December 1991, See whole document.	1-3, 5
---		-----
Y		4
X	US, A, 2,455,806, (M. B. REACH), 07 December 1948, See whole document.	6, 7
A	US, A, 3,156,470, (E. H. NEWKIRK), 10 November 1964, See whole document.	8-12

Further documents are listed in the continuation of Box C.

See patent family annex.

•	Special categories of cited documents:	
•	A* document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
•	E* earlier document published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
•	L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
•	O* document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
•	P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

06 SEPTEMBER 1994

Date of mailing of the international search report

OCT 19 1994

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

MARK S. GRAHAM

Telephone No. (703) 308-1355